

Case 3584***Erythemis* Hagen, 1861: proposed precedence over *Lepthemis* Hagen, 1861 (Insecta, Odonata)**

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Abstract. The purpose of this application, under Articles 23.9.3 and 81.1 of the Code, is to conserve the widespread usage of the generic name *Erythemis* Hagen, 1861 for a group of common dragonflies from the New World over the simultaneously published nominal genus *Lepthemis* Hagen, 1861, selected to take precedence by the First Reviser action (Article 24.2), whenever these names are considered to be synonyms. This proposal seeks to achieve the least change in the nomenclature of the species currently placed in these two genera, in strict accordance with Principle 4 of the Code.

Keywords. Nomenclature; taxonomy; Insecta; Odonata; LIBELLULIDAE; *Erythemis*; *Lepthemis*; *Erythemis peruviana*; *Mesothemis*; dragonflies; New World.

1. Hagen (1861), in a work dealing with North American species, established three genera for the reception of several new and previously described species of New World dragonflies. The first, *Lepthemis* (p. 160) included three species, *Libellula vesiculosa* Fabricius, 1775, *Libellula haematogastra* Burmeister, 1839 and *Libellula verbenata* Hagen, 1861. The second, *Erythemis* (p. 168) included *Erythemis furcata* Hagen, 1861, *Libellula bicolor* Hoffmannsegg in Erichson, 1848 and *Erythemis*

longipes Hagen, 1861. The third, *Mesothemis* (p. 170) included *Libellula simplicicollis* Say, 1840, *Mesothemis collocata* Hagen, 1861, *Mesothemis corrupta* Hagen, 1861, *Mesothemis illota* Hagen, 1861, *Libellula attala* Selys in Sagra, 1857, *Libellula mithra* Selys in Sagra, 1857 and *Libellula longipennis* Burmeister, 1839 as valid species. He also listed *Libellula acuta* Say, 1840 as a synonym of *Lepthemis vesiculosa* (p. 161), *Libellula caerulans* Rambur, 1842 and *Libellula maculiventris* Rambur, 1842 as synonyms of *Libellula simplicicollis* (p. 170), *Libellula annulata* Rambur, 1842 (partim, nec *Libellula annulata* Palisot de Beauvois, 1807) as a synonym of *Libellula mithra* Selys in Sagra, 1857 (p. 172), *Libellula socia* Rambur, 1842 and *Libellula truncatula* Rambur, 1842 as synonyms of *Libellula longipennis* (p. 173).

2. In that same work Hagen (1861), in his ‘List of South American Neuroptera’ (pp. 316–318), included fifteen more species in these three genera. Under the nominal genus *Lepthemis* (p. 316) five more species were cited, two already described species, *Libellula cardinalis* Erichson, 1848 and *Libellula attenuata* Erichson, 1848, and he introduced the following new species-group names: *Lepthemis picta* Hagen, 1861, *Lepthemis extensa* Hagen, 1861 and *Lepthemis cultriformis* Hagen, 1861, all of them as nomina nuda since they do not satisfy the provisions of Article 12 of the Code. For *Erythemis* (pp. 317–318) he included two more species-group names: *Libellula peruviana* Rambur, 1842 and *Libellula rubriventris* Blanchard, 1845, and added *Erythemis lavata* Hagen, 1861 (a nomen nudum). Finally for *Mesothemis* (p. 318) he included seven more species: *Libellula annulata* Palisot de Beauvois, 1807, *Libellula plebeja* Rambur, 1842, *Libellula connata* Burmeister, 1839, *Libellula communis* Rambur, 1842, *Libellula distinguenda* Rambur, 1842 and *Libellula abbreviata* Rambur, 1842, and again introduced a nomen nudum, *Mesothemis gilva* Hagen, 1861. All of these species-group names listed by Hagen (1861, pp. 160–173, 316–318) encompass originally included nominal species (Article 67.2.1), rendering each of the genera clearly heterogeneous groups. No type species were selected for any of these three genera.

3. Kirby (1889), by subsequent designation, fixed *Libellula vesiculosa* Fabricius, 1775 as type species for *Lepthemis* Hagen, 1861 (p. 302), *Libellula simplicicollis* Say, 1840 as type species for *Mesothemis* Hagen, 1861 (p. 303), and *Libellula peruviana* Rambur, 1842 as type species for *Erythemis* Hagen, 1861 (p. 305). Although it can be argued that *Libellula peruviana* was not a name originally included in the nominal genus *Erythemis*, which would render Kirby’s type fixation invalid under Article 67.2.5 of the Code, Hagen (1861, p. 169), under *Erythemis bicolor* (Hoffmannsegg in Erichson, 1848, p. 583), suggested synonymy with *Libellula peruviana* Rambur, 1842 (‘Is it different of *Libellula peruviana* Rambur?’) although he (Selys, 1850, p. 398) earlier had considered both as synonyms (‘Dans le Voyage de Schomburgk au Brésil et à la Guyane, M. Erichson a décrit sous le nom de *Lib. bicolor* la *Lib. peruviana*, dit M. Hagen. . .’ [In the Voyage of Schomburgk in Brazil and Guyana, Mr Erichson described under the name of *Lib. bicolor*, *Lib. peruviana*, says Mr Hagen. . .]). In addition, Hagen (1861, p. 318) included in his List of South American Neuroptera *Libellula peruviana* in *Erythemis*, a species for which he had previously (p. 169) and again (p. 318) suggested synonymy with *Libellula bicolor* Hoffmannsegg in Erichson, 1848 (‘Perhaps *E. bicolor*’). Even though *Libellula peruviana* Rambur, 1842 was provisionally cited by Hagen (1861, p. 169) under the nominal genus *Erythemis*, all nominal species listed by Hagen (1861, pp. 160–173, 316–318) in that same work

(excluding nomina nuda and those that do not satisfy the provisions of Article 67.2), even when appearing on different pages, should be considered as names originally included under provisions of the Article 67.2.1, and all are eligible for type species fixation. This validates Kirby's (1889, p. 305) act fixing *Libellula peruviana* Rambur, 1842 as type species of the nominal genus *Erythemis* Hagen, 1861. Kirby very likely followed Hagen's advice that *Libellula peruviana* was the same species as *L. bicolor* Hoffmannsegg in Erichson, 1848, and chose it as the type species.

4. Kirby (1890, p. 40), followed by Calvert (1906, p. 30), considered *Libellula bicolor* a junior synonym of *Libellula peruviana*. Calvert (1906, p. 30–31) established synonymy between *Erythemis* and *Mesothemis* and chose *Erythemis* as senior synonym based on page priority. Since Calvert (1906), *Mesothemis* as a genus-group name was rarely used, with most citations up to 1940 referring to its type species *Libellula simplicicollis* (e.g. Needham & Heywood, 1929, pp. 246–248; Hinman, 1933, p. 50; Ahrens, 1938, p. 14; Ferguson, 1942, p. 148). After 1940, *Mesothemis* has been listed as a junior synonym consistently except for two ecological studies where it was cited as a valid genus (Polcyn, 1994, p. 443), and a subgenus (Harrison & Lighton, 1998, p. 1739).

5. The number of names included under *Lepthemis* has fluctuated from the original eight (Hagen, 1861, pp. 160–162, 316), to five (Hagen, 1877, pp. 73–74), then to 11 (Brauer, 1868, p. 724), but these last two works simply listed species-group names. Calvert (1907, p. 339), followed by Ris (1911, pp. 594–608) in his monograph of the entire family, reduced this number to one, its type species *L. vesiculosa*, and this was the only name associated with the genus from 1907 to 1957.

6. The number of names included under *Erythemis* has fluctuated from the original six (Hagen, 1861, pp. 168–169, 317–318), to 11 (Brauer, 1868, p. 723), but the latter work again simply listed species-group names. Williamson (1923, pp. 8–10), in his review of the genus, reduced this number to nine, a number which remained stable until 1957.

7. *Lepthemis* Hagen, 1861 and *Erythemis* Hagen, 1861 were considered valid genera until Kennedy's (1923, p. 20) evaluation of members of these two genera. He suggested that *Erythemis* and *Lepthemis* (and the Old World *Rhodothemis* Ris, 1909) could be congeneric based on vesica spermalis (penis) morphology, but he did not formally synonymise them ('...The writer would be inclined to call the whole series of five or six groups *Lepthemis* and would consider the individual groups as subgenera...' and '...The comprehensive genus would have to be *Lepthemis* because of the [page] priority in the use of that name by Hagen...').

8. Rácenis (1958, p. 217 [footnote]), following Kennedy's noncommittal opinion cited above, and acting as the First Reviser, formally synonymised *Erythemis* and *Lepthemis* and opted for *Lepthemis*, based apparently on page priority ('Según mi opinión, *Lepthemis* Hagen, 1861 y *Erythemis* Hagen, 1861 son congénéricos y merecen solamente el status de subgéneros. Para emplear el nombre *Lepthemis* para este género, véase también las opiniones de Kennedy (1923)' [In my opinion, *Lepthemis* Hagen 1861 and *Erythemis* Hagen 1861 are congeneric and merit subgeneric status only. To use the name *Lepthemis* for this genus, see also the opinions of Kennedy (1923)]'.

9. Gloyd (1980, p. 104) discussed the dual use of the generic names *Lepthemis* (with one species) and *Erythemis* (with 11 [sic!] species), noting that '...page priority is no

longer considered adamant in the choice of a name.’ and ‘If the species in these two genera are eventually proven to be congeneric, then retaining the name *Erythemis* would evoke less change.’ She cautioned against a synonymy pending a thorough revision of a group, a similar opinion also expressed by Belle (1978, p. 5).

10. Usage of either name during the last 50 years (1960–2011) shows an inconsistency of use for the ten species presently constituting these two genera. Only six citations, Lutz & Pittman (1970, pp. 280–281, 283), Paulson (1977, p. 180; 1982, p. 266), Sherk (1977, p. 394; 1978, p. 62), and Fleck (2004, pp. 53–54) followed Rácenis (1958, 1959) in using *Leptthemis* as senior synonym for all ten species; 25 citations consider *Erythemis* and *Leptthemis* as valid genera; and over 120 citations by at least 65 different authors consider *Erythemis* a senior synonym (full list of citations available from the authors). Current usage of *Erythemis* as senior synonym is overwhelmingly predominant in the literature. One common species from the Eastern United States, *Erythemis simplicicollis*, has been the subject of studies in age maturation (McVey, 1985), behavior (Belle & Whitcomb, 1961; Currie, 1963; Edwards, 1987; Sanborn, 1996), sexual selection and sperm competition (McVey & Smittle, 1984; Waage, 1986; McVey, 1988), physiology and parasitology (May, 1976, 1979; McVey, 1984; Harrison et al., 1994; Painter et al., 1996; Locklin & Vodopich, 2010), taxonomy (Donnelly, 2004a); it appeared in numerous illustrated odonate field guides and faunal lists (Dunkle, 1989; Abbott, 2001, 2005, 2006; Curry, 2001; Nikula et al., 2002, 2003; Legler et al., 2003; Manolis, 2003; Mead, 2003; Biggs, 2004; Beaton, 2007; Behrstock, 2008), and general accounts on Odonata (Arnett, 2000; Silsby, 2001; Corbet, 2004; Triplehorn & Johnson, 2005; Evans, 2007). There are also numerous taxonomic references, checklists, handbooks and textbooks where species placed under *Erythemis*, *Leptthemis* and *Mesothemis* have been included all together under *Erythemis* in South America (Rodrigues-Capitulo, 1992; Costa & Pujol-Luz, 1993; Carvalho & Nessimian, 1998; Costa et al., 2000; Heckman, 2006; von Ellenrieder & Muzón, 2008); Central America (Measey, 1994; Boomsma & Dunkle, 1996; Ramírez, Paulson & Esquivel, 2000; Förster, 2001); North America (González-Soriano & Novelo-Gutiérrez, 1996; Dunkle, 2000; Needham et al., 2000; Donnelly, 2004b; Paulson, 2009), or the whole of the New World (Davies & Tobin, 1985; Garrison, 1991; Bridges, 1994; Steinmann, 1997; Garrison et al., 2006).

11. An unpublished Master’s dissertation (Pinto, 2008), currently in the final stage for publication (Pinto & Carvalho, in prep.) shows all 10 species constituting *Erythemis* and *Leptthemis* to be congeneric, necessitating the choice of either *Leptthemis* or *Erythemis* as senior synonym. Setting aside the senior synonym *Leptthemis* in favor of the almost universally used *Erythemis* would cause the least change in nomenclature and would promote stability for this group of dragonflies, especially as several members of the latter genus are common widespread species, some of which have been the subject of studies in behavior and sexual selection. Applying the rule of First Reviser (Article 24.2.1 of the Code) would not promote stability of nomenclature (Principle 4 of the Code).

12. The International Commission on Zoological Nomenclature is accordingly asked:

- (1) to use its plenary power to rule that the generic name *Erythemis* Hagen, 1861 be given precedence over *Leptthemis* Hagen, 1861, whenever the two are considered to be synonyms;

- (2) to place on the Official List of Generic Names in Zoology the name *Erythemis* Hagen, 1861 (gender: feminine), type species by subsequent designation by Kirby (1889) *Libellula peruviana* Rambur, 1842, with the endorsement that it is to be given precedence over *Lepthemis* Hagen, 1861, whenever these two names are considered synonyms;
- (3) to place on the Official List of Generic Names in Zoology the name *Lepthemis* Hagen, 1861 (gender: feminine), type species by subsequent designation by Kirby (1889) *Libellula vesiculosa* Fabricius, 1775, with the endorsement that it is not to be given priority over *Erythemis* Hagen, 1861, whenever these two names are considered synonyms;
- (4) to place on the Official List of Specific Names in Zoology the following names:
 - (a) *peruviana* Rambur, 1842, as published in the binomen *Libellula peruviana*, senior subjective synonym of *Libellula bicolor* Hoffmannsegg in Erichson, 1848, specific name of the type species of *Erythemis* Hagen, 1861;
 - (b) *vesiculosa* Fabricius, 1775, as published in the binomen *Libellula vesiculosa*, specific name of the type species of *Lepthemis* Hagen, 1861.

Acknowledgements

We thank Alcimar L. Carvalho (*Museu Nacional, Rio de Janeiro*), Jürg De Marmels (*Universidad Central de Venezuela, Maracay*), Jan van Tol (*Naturalis, Leiden*), and Natalia von Ellenrieder (*California Department of Food & Agriculture, Sacramento*) for advice and help with this application, and the two Commissioners who reviewed the application.

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Acknowledgement of receipt of this application was published in BZN **69**: 83.

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